Air Force Fuels Quality Update

Technical Division
Air Force Petroleum Office
USAF

Charleston AFB SC
"Off-Spec Fuel Receipts"

- Apr 98; High PC, High DP'
  - Drove F/S Element Change-outs
- Aug 98; High PC, 3.0 Mg/l
- Feb 99; Water >20, PC 2.6 Mg/
- Sept 99; PC, 3.3 Mg/l
- Dec 99; Water, >20

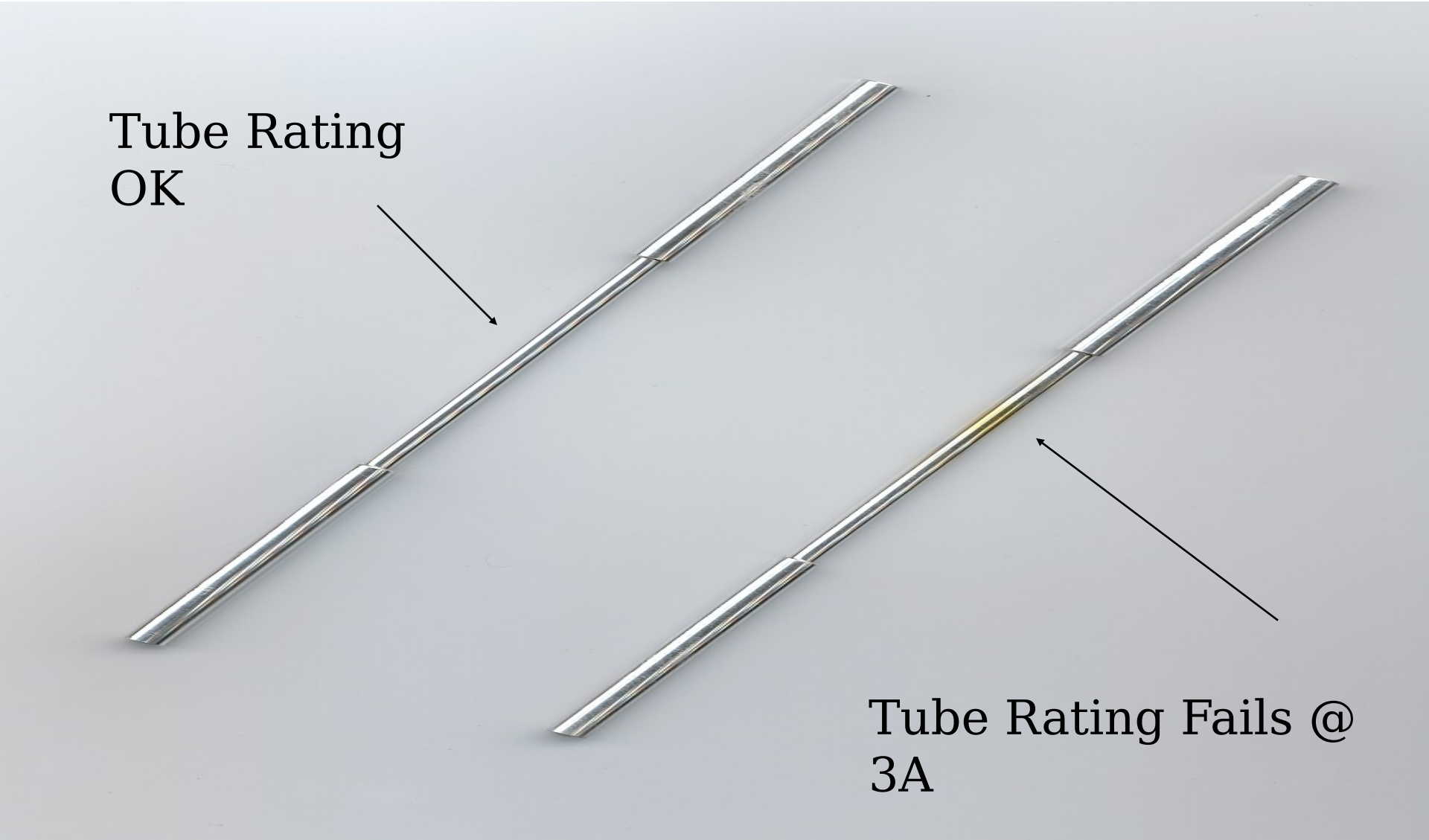
Charleston AFB SC (Cont.)

- Suspect Causes
  - Leaky Geodesic Dome at DFSP Charleston
  - Lack of Receipt F/S & Inadequate H20 Removal Abilities
- Corrective Actions To Date
  - DESC Installed Filtration Between DFSP and Charleston AFB
  - DESC Initiated Corrective Action Against Contractor
  - DFSP Charleston Identified Facility Upgrade/Repair Projects
  - AF Testing 4th Edition API 1581 Elements
  - DESC Installed 4th Edition API Elements in DFSP Filter

NELLIS AFB "JFTOT Failure" (Feb 99)

- Oct 98; Waiver Granted
  - Permitted Paramount to Add .2 Mg/l MDA
- Feb 99; Aircraft Sample Failed JFTOT
- Nellis Bulk/Hydrant Tanks Failed JFTOT
- Supporting DFSP Tank's Failed JFTOT
- 7.6M Gallons Affected by Failing JFTOT

JFTOT RESULTS



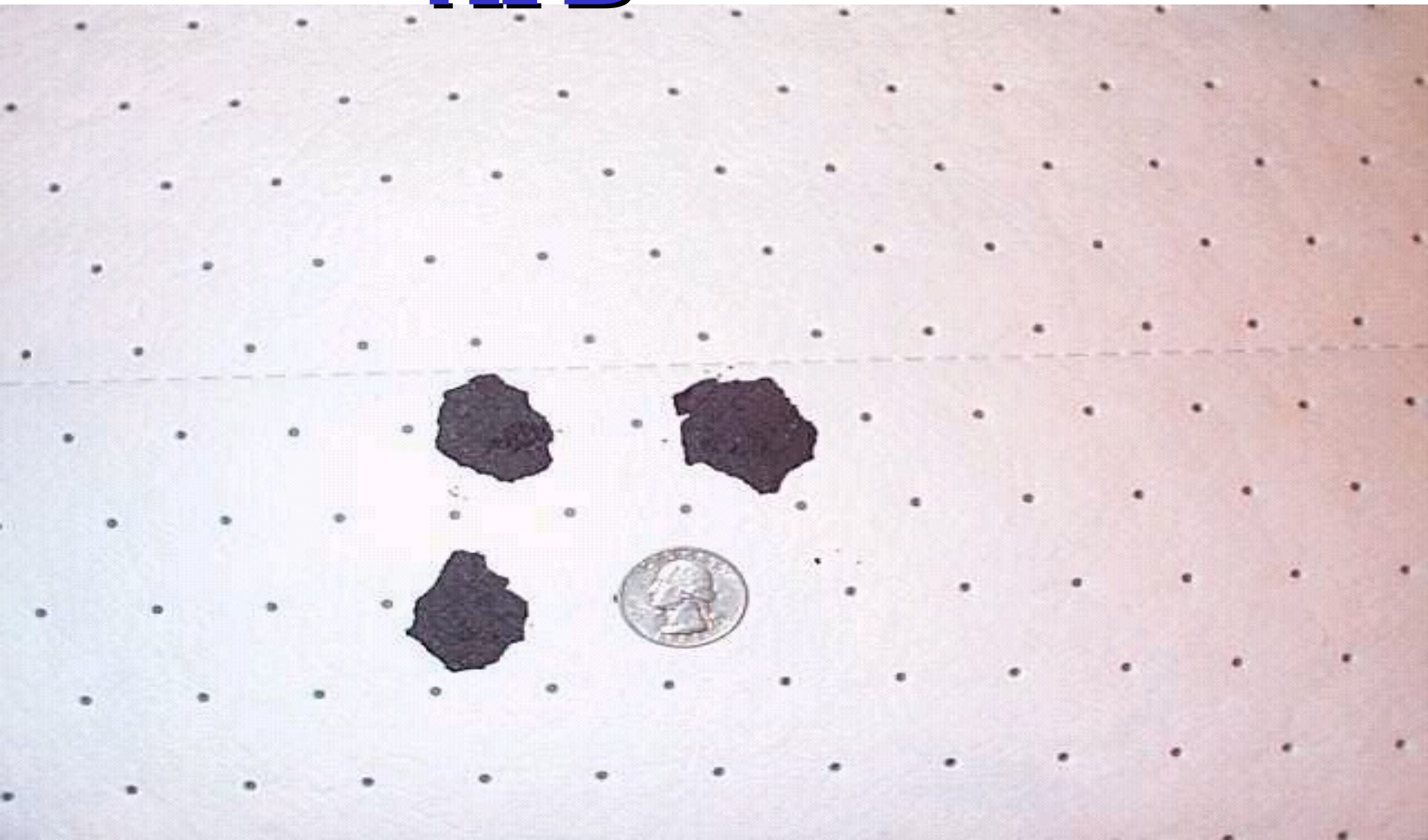
NELLIS AFB

- Metals Analysis Performed by AFRL/Fuels
  - Disclosed Traces of Zinc, No Other Metals
- MDA Injected In Failing Inventories @ .2 Mg/l
  - Passed JFTOT After MDA Injection
- Jan 00; Reoccurred in Cal-Nev Tank
  - .2 Mg/l MDA Corrected Problem
- Apr 00; Reoccurred (Nellis, Cal-Nev, DFSP)
  - Again MDA Added @ .2 Mg/l to “Fix” Problem
- Sep 00; Reoccurred (Norwalk DFSP) TDR 4 Two Tanks
- DESC and SFTH Investigating/DESC hired SWRI to Study

LANGLEY AFB (Mar 99)

- Mar 99; Initial Barge Receipt Sample Failed PC
- QSR Responded/Operation Shut-down
- QSR Directed Resamples
  - Barge composite failed PC
  - Receipt line sample failed PC
- QSR Rejected Barge

LANGLEY AFB



LANGLEY AFB (CONT)

- Receipt Failures Continued from High PC
- Corrective Actions Attempted
  - Barge Cleaned
  - Increased QS During Vessel Loading
  - Light-loaded the Barge
  - Problems Continued
- Contractor Finally Defaults
- New Contract Awarded
  - Seemed to Remedy PC Problems
- Sept 00; PC Problems Recurring--Visible

TYNDALL AFB (DEC 99)

- Barge Receipt Samples Fail Water & PC Tests
  - Hay Pack Filter Operation Questionable
- 1,100 & 470 Gls H20 Removed From Rec Tk's
- Intermediate Elements Changed 7-10 Days
- Corrective Actions to Date
  - SFTH and DEO-H Performed Site Visit
  - QS Increased During Load-out
  - Suspect Barge Removed From Service

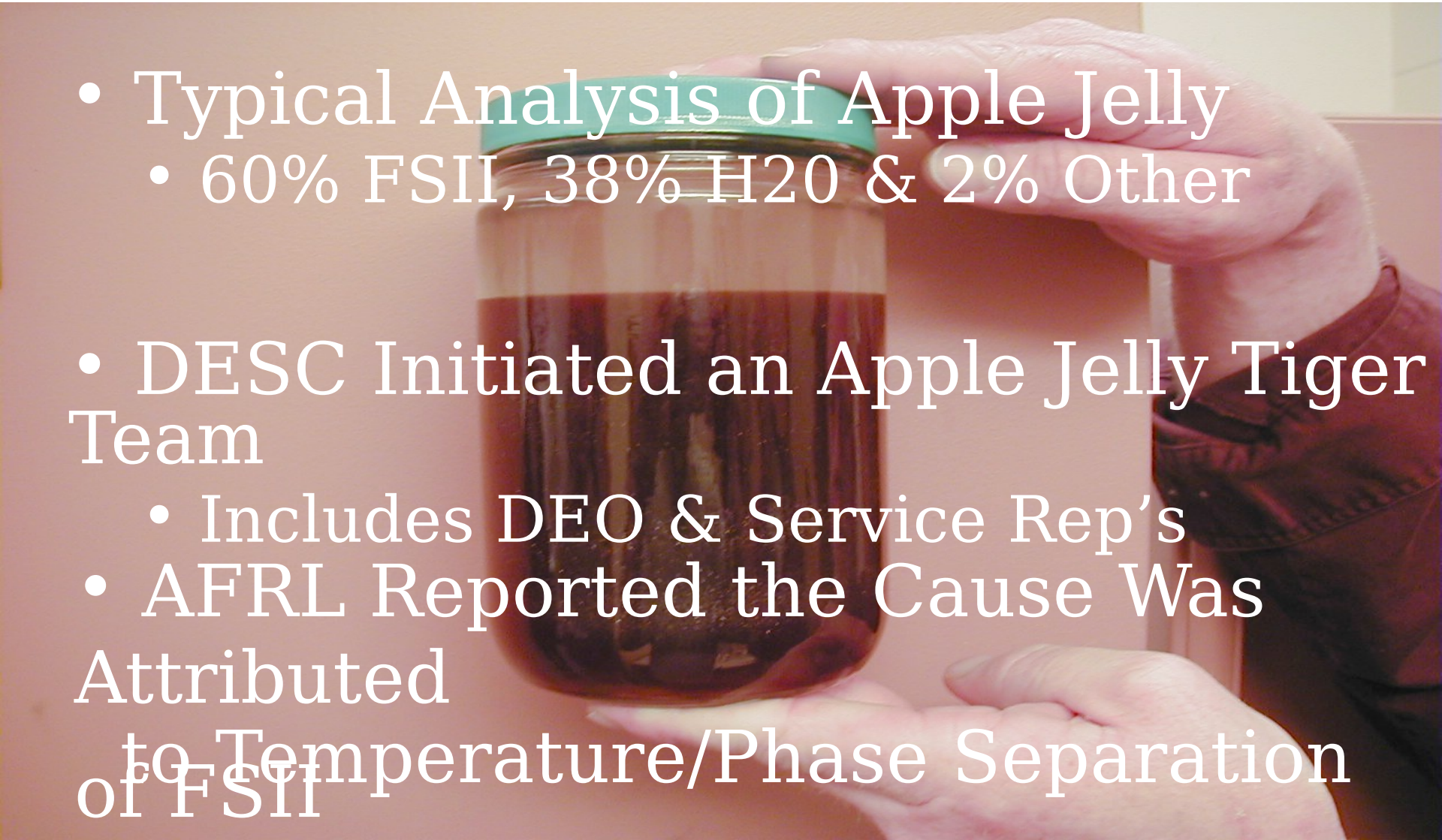
Eareckson JFTOT Failures (Sept 99)

- Eareckson AFS
  - Barge composite sample failed JFTOT
  - Receipt tanks failed JFTOT
  - Entire Storage System Contaminated
    - Also contaminated King Salmon (common receip vessel)
- Trace Metals Tests Performed at Cape Lab
  - Trace Metals Found
    - MDA Added--Post Samples Failed JFTOT
- Suspect Fuel (2.1M Gal) Consolidated

Eareckson JFTOT Failures (CONT)

- Only 50K of On-Spec Product for A/C Support
  - NOTAM Issued Advising Limited Fuel Available
- Apr 00; Barge Rcpt Tank Failed JFTOT
  - Didn't Flush Barge Rcpt Line
    - Required MDA to Fix JFTOT
- Sept 00; Barge Rcpt Tank Failed JFTOT
  - Suspect Deicer Contamination
  - Threw All Fuel Off-Spec--No Fuel for A/C support
- Actions Underway to Remedy Eareckson
  - Filter October '00 Rcpt Through Faudi Filter
    - Push Rcpt into Newly Cleaned Tank

“Apple Jelly” Advisory



- Typical Analysis of Apple Jelly
  - 60% FSII, 38% H20 & 2% Other
- DESC Initiated an Apple Jelly Tiger Team
  - Includes DEO & Service Rep’s
- AFRL Reported the Cause Was Attributed to Temperature/Phase Separation of FSII

Apple Jelly

Kunsan AB

Minot AFB

Charleston AFB

NAS ceana

Apple Jelly
"Things Learned"

- Fuel Loaded Clear & Bright--Arrives Cloudy
- Temp Variations Precede High DP's
  - Most Element Failures Occur @ 32 - 46 (F)???
- Manifests Itself in Low-points & Sumps
- API 1581 Elements Disarmed By Surfactants

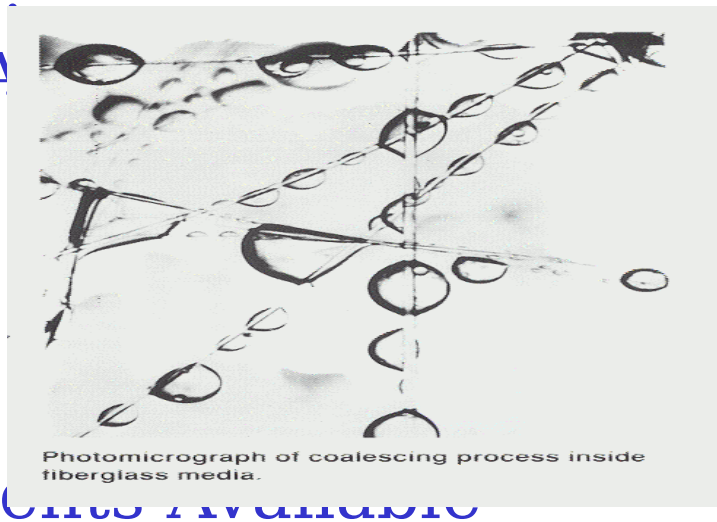
  Otis ANGB Experienced Some Success With Faudi Elements
- Expect/Report Reoccurrence This Winter

“Other Challenges”

- Ground Fuel Commingling
  - Operator Error
- Local Additive Injection
  - Over injecting SDA--Not Diluted to 9 Parts Fuel Before Injecting
    - Causes Some A/C Instrument Gages to “Roll”
  - Over Injecting/Improper Blending of FSII
    - Causes Corrosion Problems
    - Contributes to Formation of Apple Jelly

INFRASTRUCTURE CONCERNS "Filtration"

- ID Receipt Filtration Requirements
- Current Filters Disarmed by Surfactants
  - Most Common Surfactants:
    - Static Dissipator Additive (SDA
    - Corrosion Inhibitor
    - +100 Additive
- Filter Technology
  - API 1581 4th Edition Elements Available


Photomicrograph of coalescing process inside fiberglass media.

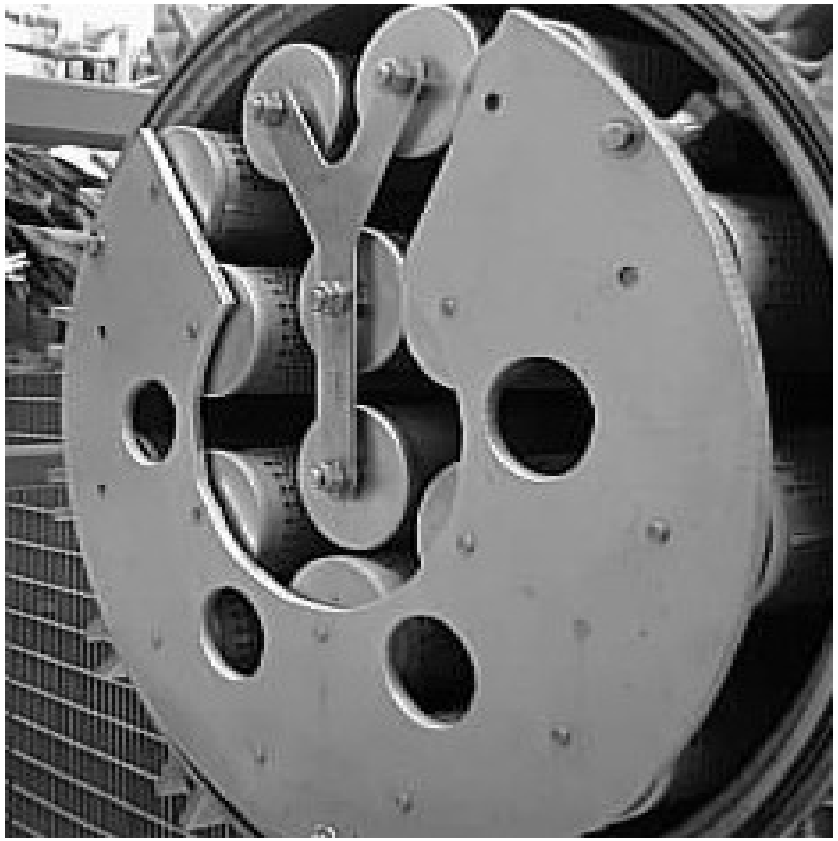
NEW FILTRATION "TECHNOLOGY"

- API 1581, 4th Edition, M100 Class Elements
  - First Filters Tested w/Additized JP8 (+100 Too)
- Agreement with Facet
  - Side-by-Side 3rd Edition Vs. 4th Edition
    - Field Trial Being Conducted @ Charleston AFB SC
    - Further Expanded to Include Randolph AFB
- Otis ANGB (4th Ed, DESC Funded AJ Test)
- Burlington, VT (Unit Funded) AJ Location

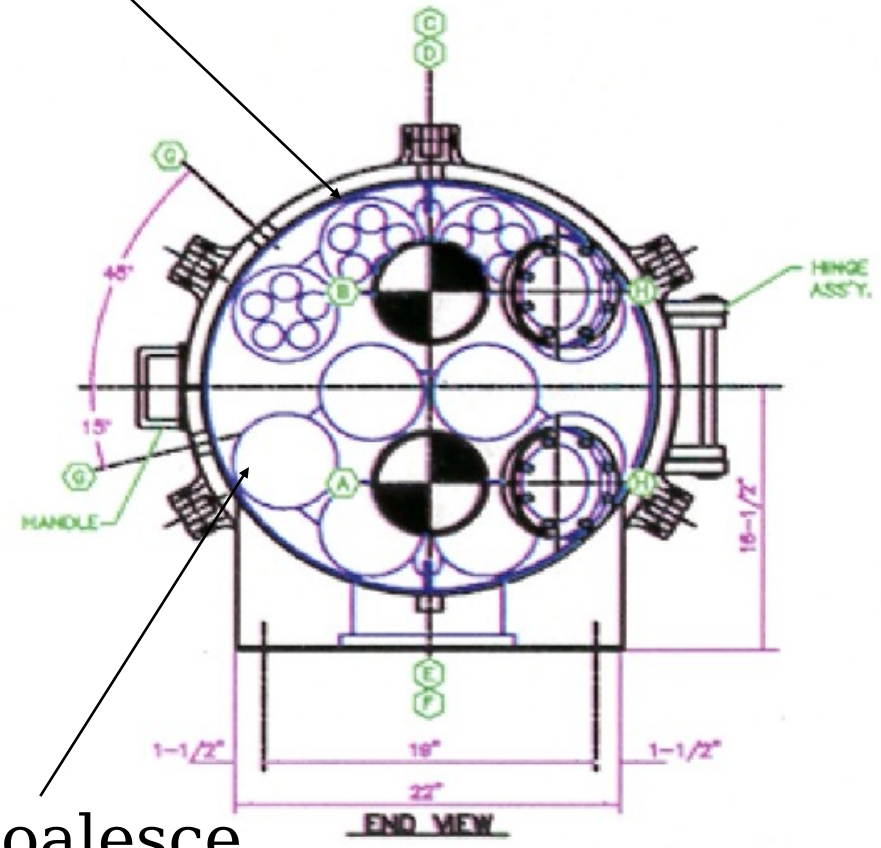
FUTURE PLAN

- Three-Stage Filter Vessels at the Last Filtration Prior to the Aircraft Skin
- IP Monitors in Hydrant Servicing Equipment Being Considered
- API 1581, 4th Edition, M100 Elements In Fixed Systems

2-STAGE vs. 3-STAGE VESSELS



Separators & Monitors



Coalescers

SUMMARY

- Recent Quality “Challenges”
- Infrastructure Concerns/Future Filtration
- Receiving Off-Spec Fuel
- Reporting Off-Spec Fuel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